JUNE, 1913.

The month, while dry, was fairly pleasant. The mean temperature, 75.2°, was 2.5° above normal. The highest temperature, 99°, occurred on the 26th, and readings of 90° or more obtained on 12 days. Hot but not destructive winds occurred on the 20th and 27th. The rainfall, 2.76 inches, was 2.21 inches less than the normal; and as 2.01 inches fell on the 4th, 5th, and 6th, the greater portion of the month was decidedly droughty. Showers and cool, droughty weather marked the close of the month.

JULY, 1913.

The month was hot and dry, the total precipitation, 0.15 of an inch, being 3.47 inches less than the normal. This is the least amount of rainfall ever recorded at this station during any July, the previous driest July being that of 1890, with a rainfall of 0.23 of an inch. The mean temperature for the month, 83.2°, was 5.1° above the normal, and temperatures above the normal were recorded from the 1st to the 9th, 13th to 18th, and 26th to 30th. The maximum temperature was 90°, or above, on 26 days; 95°, or above, on 18 days; 100°, or above, on 13 days; 105°, or above, on 6 days; and 110° on 1 day.

From the 13th to the 17th, the maximum temperature readings ranged from 101° to 110°, and the average maximum for the 5-day period was 107°. The culmination of the heated period occurred during the afternoon of the 14th, when the temperature attained a maximum of 110°.

The monthly mean relative humidity, 47 per cent, was 19 per cent less than the July normal, and the 7 p. m. mean, 29 per cent, was 24 per cent less than the average. The lowest recorded during the month was 13 per cent, at 7 p. m. of the 16th, and percentages of 20 per cent, or less, occurred on the 7th, 15th, 16th, 17th, and 22d.

AUGUST, 1913.

The rainfall during the month was 0.30 of an inch, a deficiency of 2.51 inches compared with the normal. This is likewise the least rainfall ever recorded at this station during any August. The previous dry August was that of 1909, when the rainfall amounted to 0.37 of an inch.

The mean temperature for the month was 85°, an excess of 8.5° compared with the normal. Temperatures slightly below the normal were recorded on the 1st, 2d, and 22d. The maximum temperature was 90°, or above, on 29 days; 95°, or above, on 27 days; 100°, or above, on 21 days; and 105°, or above, on 6 days. The mean of the daily maximum temperatures was 101°, the highest ever obtained at this station, being 1° higher than the mean maximum for July, 1901.

A temperature of 107° was attained on the 5th, 8th, and 27th; this is the highest ever recorded at this station during any August. The mean relative humidity for the month, 42 per cent, was 25 per cent below the 25-year average, and the afternoon mean, 25 per cent, was 30 per cent below the normal.

SEPTEMBER, 1913.

Hot, dry weather continued during the first 7 days of the month. The maximum temperature was 99° on the 1st, 2d, and 3d; 100° on the 4th, 102° on the 5th, 103° on the 6th, and 100° on the 7th. Light rains and lower temperatures occurred on the 8th, 9th, and 10th, and the drought of 1913 passed into history.

Many wells in this city and county failed during the drought, but the main wells of the city water system contained an ample supply for all purposes during the entire summer.

The bed of the Republican River has been dry and dusty since the first decade in August.

It is not believed that any loss of life can be attributed to the heat of the summer, but there were many cases of illness due to the debilitating effect of the long periods of terrific heat.

All farm work was necessarily suspended during the periods of extreme heat, but the care taken of the stock was such that no loss occurred. Fruit and garden truck were complete failures, the hay crop cut about 50 per cent, and potatoes were damaged 85 per cent. The corn crop was practically destroyed. The most conservative estimates place the loss at 96 to 98 per cent. In 1894 the corn was damaged 75 per cent, and in 1895 the loss was 65 per cent.

NOTES ON THE DROUGHTS AND HOT WEATHER DURING THE SPRING AND SUMMER OF 1913 IN THE VICINITY OF DODGE CITY, KANS.

By H. McP. BALDWIN, Observer.

There have been two droughts in this vicinity since March 1, 1913, the first drought beginning the latter part of April and continuing throughout May. The second began June 14 and continued until September 8, when a heavy rain began falling over Ford County.

During the first drought winter wheat, the principal crop of this section, was seriously injured. This crop, which had withstood the rather dry weather that had prevailed during a greater portion of the preceding fall and winter and which promised an average yield, if not better, when the drought set in, was one of the poorest that has been harvested, three-fourths of it having been destroyed by the dry weather and hot winds. The money value of the injured wheat in this county is generally considered to be about one and a half million dollars. The total precipitation during the first drought was 0.81 inch, or only 22 per cent of the normal. During the same period there was an excess of 141° in the temperature, with extremely hot weather during the last four days of May, the daily excess ranging from 9° to 14°.

Winds of 30 miles or higher were experienced on April 29 and 30, May 1, 2, 13, 17, and 19, and were accompanied by generally abnormally high temperatures.

During the second drought, which continued 86 days, the total precipitation was 1.68 inches, or 19 per cent of the normal. The greatest 24-hour rainfall during July was only 0.26 inch, which was not sufficient to be of any material benefit, and there was no rain in August sufficiently heavy to relieve to any appreciable extent the protracted drought. The average mean temperature for June, July, and August was 78.5°, only 0.7° lower than the average for the same months in 1901, the hottest summer in the history of the station. There never was a hotter month in this vicinity than August of the present year, the mean temperature for the month, 82.4°, equaling the highest mean temperature of July, which occurred in 1890 and 1901. From June 14 to September 8, inclusive, there were 66 days with a temperature of 90° or higher and 17 days with a temperature of 100° or higher. Compared with other dry seasons, there were more days

with temperatures of 90° or higher and 100° or higher than in any previous year.

In 1910 the precipitation was the least ever recorded at Dodge City, equaling the dry year of 1893, when the total was 10.12 inches. Notwithstanding the great deficiency in precipitation, Ford County in 1910 had the largest and best paying wheat crop in its history and was among the first five counties in Kansas in wheat production. The unusually large wheat crop for that year can be attributed to the unprecedented precipitation and abnormally high temperature of November, 1909, and the severely cold December following. Up to the time of the remarkably heavy rain, sleet, and snow storm of the latter part of November, it had been unusually warm, and the ground was not frozen when the heavy precipitation occurred, which in four days amounted to 4.19 inches. Owing to the condition of the soil, nearly all of this precipitation was stored up, very little of it having been lost by evaporation. Immediately following this heavy precipitation unusually cold weather set in, December of that year being the second coldest of any December since the establishment of this station.

Prior to 1900 this section was not engaged in agricultural pursuits to any great extent. The acreage under cultivation in 1901 was not over a fourth of the acreage in winter wheat in 1913 and consequently the loss could not have been nearly as great.

While nearly all of the streams are dry at this writing, September 11, yet the supply of water from the underflow is abundant for present and future needs of man and beast. The city waterworks is pumping about 15,000 gallons of water per minute, which is, and has been, ample for all purposes. The wells will supply sufficient water for the stock during the coming winter.

The general health in this community has been good; there have been no epidemics, and sickness has probably been less than in previous years.

In addition to the damage done by the drought considerable damage was done by grasshoppers during July and the early part of August, and on the whole the droughts of 1913 have generally been considered by the oldest residents of this vicinity to have been the worst ever experienced.

NOTES ON THE HEAT AND DROUGHT OF THE SUMMER OF 1913 AT IOLA, KANS.

By H. K. HOLCOMB, Observer.

The drought and heat wave of the present year continued from July 25 to September 8, inclusive, in this vicinity. During this period the light showers which occurred were of no material benefit and the few days when the temperature fell below normal gave only temporary relief.

The mean temperature for the period of 46 days drought was 84, being an average daily excess as compared with the normal of 8°, and the accumulated excess in temperature for the period amounted to 368°. On 30 days of the period the mean temperature was above normal, and on 23 days the temperature attained a maximum of 100° or above, reaching an obsolute maximum of 105° on August 6. The total precipitation for the period was 0.35 inch, and the accumulated deficiency amounted to 4.86 inches. On 35 days of the period southerly winds prevailed.

Preceding the drought this year there was an accumulated deficiency in precipitation of 3.14 inches, which accounted for the comparatively small supply of underground water.

The drought destroyed pastures for the remainder of the season, reduced the corn in this vicinity to one-fourth of a crop, the hay to half of a crop, and the late vegetables to one-fourth of a crop. Wheat was not damaged, as that crop was matured before the drought became effective, and early vegetable crops were uninjured. The drought diminished the stock water until the supply on uplands was exhausted and many persons were compelled to haul water several miles for household and stock purposes. The volume of water stored by dams in the Neosho River would last for several months longer should no rain fall during that time. Dryness caused many cracks extending down 3 or 4 feet in the soil. Along the railroads the cracks in the ground caused sink holes and necessitated frequent repairing of the ballast. The dryness of the soil prevented plowing, and deferred the sowing of alfalfa and wheat, and the excessive heat interfered to some extent with construction work. In several localities shallow rooted shade trees died from absence of moisture in the soil. At the Iola Portland cement plant, having a capacity for producing 5,000 barrels of cement daily, the water supply stored at the regular intake became exhausted, which necessitated laying a pipe line to the Neosho River. The excessive heat also interfered with the working of the engines, causing shutdowns and repairs, and an extra force of laborers had to be employed in the mill and kiln rooms.

NOTES ON THE DROUGHT AND HEAT DURING THE SUMMER OF 1913 AT WICHITA, KANS.

By H. P. HABDIN, Observer.

Judged by the climatological data available here and the reminiscence of the oldest settlers, the 1913 drought was beyond question the most severe and caused a greater crop loss than any other drought of which we have a record or tradition.

Of the years covered by the records of this office, 1888–1913, those showing droughty conditions are:

In 1890, from June 20 to August 22, there was but 2.17 inches of rainfall, 0.01 inch or more occurring on 10 days. The mean maximum temperature was 93°, the highest 102°, and 100° or more occurred on 7 days.

In 1893, from August 1 to September 18, the total precipitation was 1.51 inches. This amount fell in showers on 8 days in August. The highest temperature was 104°, and 100° or more occurred on 2 days. This is referred to by those who went through it as a very disastrous drought.

In 1897 a drought began with May 14 and continued until August 2. In that period showers on 3 days totaled 0.64 inch in May; on 11 days, 1.99 inches in June; and on 9 days, 1.49 inches in July. June 16 a heated period began, and on August 3, when the drought was broken, there had been 48 days of insufficient precipitation, having maximum temperatures averaging 95°, and reaching 100° to 102° on 10 days. This is referred to as a crop-failure year, but the census report shows that considerable agricultural products were marketed.

In 1901 there was practically no rain, only 0.22 inch from June 20 to July 17. The daily maximum temperatures averaged 98°; 100° or more occurred on 11 days, and during the last 11 days of the drought the maximum temperatures ranged from 99° to 103°, the latter occur-